

CHAPTER SIX

NATURALISING WAIWHETŪ STREAM CONCRETE CHANNEL, NAENAE



The channelisation of streams and rivers during the mid-20th century, usually by engineering methods, was primarily for the purposes of flood control, drainage, navigation, and prevention of erosion. This has been to the detriment of native freshwater flora and fauna, resulting in mostly ecologically sterile stream channels and is now a problem in many countries around the world.

Globally, solutions for naturalising channelised waterways include removing all or part of the structure. This is costly and the ecology of any natural waterway further downstream could be compromised by resultant sediment transport downstream.

In Naenae there is approximately 2.3 km of channelised Waiwhetū Stream as well as smaller side channels (Fig.1) from Rata Street to Waddington Drive ext. Hutt City Council (HCC) and Wellington Water (WW) are responsible for this section of the stream.



Fig. 1 Concrete channel confluence, Naenae Park



Fig. 2 Digger removing concrete berm

One of the problems with channelisation is the increased speed of water flows and concentrated volumes down straightened concrete channels compared with natural meandering waterways. In Naenae, this has a negative impact on the ability of native fish to migrate upstream. Observations during spring show the speed of water in the lower section of the channel prevented upstream migration of inanga (*Galaxias maculatus*); they could not navigate the fast flow even with repeated attempts. Fish that can move overland, such as eels, can bypass water-speed barriers.

In 2015, in an effort to improve inanga upstream migration and naturalise the channel, Craig Cottrill (HCC) supported a FWS initiative that involved removing two separate sections of the 2 m wide concrete berms along the lower 50 m of the channel (Fig. 2). The trial included placing large and mixed rocks into the channel itself and FWS volunteers planting the areas that had been under concrete. The naturalisation potential of the initiative was supported by Diana Isaac and Iqbal Idris, Senior Engineers (WW), who wanted to contribute by removing another section of berm further upstream; the latter was achieved in 2016 with planting and 'rock rolling' (into the channel) done by WW volunteers.

The presence of large cobbles (or roughness) in the base of the concrete channel creates a form of riffle which slows the flow velocity down and creates a backwater effect upstream under normal flow conditions (Fig. 3) and velocity is reduced enough for inanga to be able to swim upstream (which has been observed).



Fig. 3 Planted area and showing riffle created after placing rocks in concrete channel, Naenae

It was noticed that a length of concrete berm was missing on one side of the channel, just upstream from Waddington Drive, so in 2016 a planting was arranged for a small group of students from Wā Ora Montessori School (Fig. 4) and the softening effect of draping native *Carex* is evident after three years growth.

This naturalisation initiative has largely been successful; the most obvious change has been the creation of the ‘babbling brook’ sound of water passing over and through rocks compared with the silence of water in a concrete channel. Some plants have suffered because during heavy rain events they have been impacted by fast flows coming down the channel from upstream as well as detritus and domestic rubbish.



Fig. 4 Wā Ora Montessori School students planting in 2016 and result

However, the main deterrent to extending this method is the cost of removing large slabs of concrete.

In 2017, FWS was contacted by Brendan Elks, a local resident and member of the Naenae Nature Trust community group, seeking input into how to improve the Rata Street (furthest upstream) section of the concrete channel and to see whether we were able to help with providing native plants to continue planting in the Rata Street area; a planting project that began a few years earlier but had stalled. The author met with two residents (Brendan Elks and Andy Mitchell) on 19 September 2017 where the issues were discussed.

Subsequently, a planting/naturalisation concept was formulated and a proposal for HCC to consider was produced. The concept included naturalising the concrete channel between Rata Street and a footbridge at the north end of Naenae Park (Fig. 5) with the use of rock mini-weirs across the channel to slow water flow and also create pooling behind the weirs. The proposal included planting a 1.5m width along the sides of the concrete berms and with *Carex* spp. closest to the edge of the concrete; these would drape over the edge and disguise the concrete. In addition, it was proposed that a walk/cycle path be



Fig. 5 Aerial map of naturalisation area, Naenae with the red lines

installed along the west side of the channel for access to Naenae Park and beyond.

At a site visit in October, Bruce Hodgins, Divisional Manager Parks and Gardens (HCC), supported the proposed project. Two WW engineers were also met on site to assess any flow risks; none were indicated and work started in 2018. HCC developed the path, WW provided the rocks, and Naenae Nature Trust has held community plantings in the area since 2018 (Fig. 6).

Naturally transported gravels have filled the channel itself, disguising the concrete and providing a natural substrate. One of the main issues has been that the rocks delivered for the mini-weirs were not large enough; some have been buried under gravels, and some removed illegally (B. Elks pers. comm.). However, there is a vast improvement in the aesthetics of this section of stream; from barren and ugly (Fig. 7) to vegetated and pleasing (Fig. 8, 9) and with access to Naenae Park from Rata Street.

This novel project offers a cost-effective solution/opportunity to naturalise the entire length of channelised Waiwhetū Stream down through Naenae Park and beyond. It has largely been successful; at this stage it has not progressed further downstream although HCC has recently constructed a connecting asphalt walking/cycling track around the channel side of Naenae Park from the footbridge southwards to Seddon Street, opening up more opportunities for restoration planting in conjunction with naturalisation.

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Fig. 6 Planting event by Naenae Nature Trust volunteers, 2018



Fig. 7 Barren and ugly before planting and naturalisation



Fig. 8 Naturalisation progress 2022



Fig. 9 Carex secta draping over edge of concrete berm and taller plantings at the back